

## SEQUENCE LISTING

<110> Ajinomoto Co., Inc.

<120> Method for Producing L-Amino Acid

<130>

<160> 24

<210> 1

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 1

ggcgagctcc cagtaaccgg aaataag

27

<210> 2

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

<400> 2

cgctctagaa aggaccacgc attacgg

27

<210> 3

<211> 27

<212> DNA

40

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 3

ggcgagctca gattggtagt catattc

27

<210> 4

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

<400> 4

cggtagaa tcagcgaaga atcaggg

27

<210> 5

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

<400> 5

ggcgagctca tgttccgtgt cgggtac

27

<210> 6

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene

0 9 8 5 0 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0

<400> 6  
 ggctctagat agcaaggta taagcgg 27

<210> 7  
 <211> 35  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 7  
 ctctgaattc tcttttattt gtttttctgttttgc 35

<210> 8  
 <211> 38  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene

<400> 8  
 cgtgacctgc agcggttctca cagcgccgttgc gcctttaa 38

<210> 9  
 <211> 672  
 <212> DNA  
 <213> Escherichia coli

<220>  
 <221> CDS  
 <222> (1)..(672)

<400> 9  
 atg atg cag tta gtt cac tta ttt atg gat gaa atc act atg gat cct 48  
 Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro  
 1 5 10 15  
 ttg cat gcc gtt tac ctg acc gta gga ctg ttc gtg att act ttt ttt 96  
 Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe

20	25	30	
aat ccg gga gcc aat ctc ttt gtg gta gta caa acc agc ctg gct tcc			144
Asn Pro Gly Ala Asn Leu Phe Val Val Val Gln Thr Ser Leu Ala Ser			
35	40	45	
ggt cga cgc gca ggg gtg ctg acc ggg ctg ggc gtg gcg ctg ggc gat			192
Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp			
50	55	60	
gca ttt tat tcc ggg ttg ggt ttg ttt ggt ctt gca acg cta att acg			240
Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr			
65	70	75	80
cag tgt gag gag att ttt tcg ctt atc aga atc gtc ggc ggc gct tat			288
Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr			
85	90	95	
ctc tta tgg ttt gcg tgg tgc agc atg cgc cgc cag tca aca cca ccg caa			336
Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln			
100	105	110	
atg agc aca cta caa caa ccg att agc gcc ccc tgg tat gtc ttt ttt			384
Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe			
115	120	125	
cgc cgc gga tta att acc gat ctc tct aac cgc caa acc gtt tta ttt			432
Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe			
130	135	140	
ttt atc agt att ttc tca gta aca tta aat gcc gaa aca cca aca tgg			480
Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp			
145	150	155	160
gca cgt tta atg gcc tgg gcg ggg att gtg ctc gca tca att atc tgg			528
Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp			
165	170	175	
cga gtt ttt ctt agt cag gcg ttt tct ttg ccc gct gtg cgt cgt gct			576
Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala			
180	185	190	
tat ggg cgt atg caa cgc gtt gcc agt cgg gtt att ggt gca att att			624
Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile			
195	200	205	
ggt gta ttc gcg cta cgc ctg att tac gaa ggg gtg acg cag cgg tga			672
Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg			
210	215	220	

&lt;210&gt; 10

&lt;211&gt; 223

&lt;212&gt; PRT

&lt;213&gt; Escherichia coli

<400> 10  
 Met Met Gln Leu Val His Leu Phe Met Asp Glu Ile Thr Met Asp Pro  
 1 5 10 15  
 Leu His Ala Val Tyr Leu Thr Val Gly Leu Phe Val Ile Thr Phe Phe  
 20 25 30  
 Asn Pro Gly Ala Asn Leu Phe Val Val Val Gln Thr Ser Leu Ala Ser  
 35 40 45  
 Gly Arg Arg Ala Gly Val Leu Thr Gly Leu Gly Val Ala Leu Gly Asp  
 50 55 60  
 Ala Phe Tyr Ser Gly Leu Gly Leu Phe Gly Leu Ala Thr Leu Ile Thr  
 65 70 75 80  
 Gln Cys Glu Glu Ile Phe Ser Leu Ile Arg Ile Val Gly Gly Ala Tyr  
 85 90 95  
 Leu Leu Trp Phe Ala Trp Cys Ser Met Arg Arg Gln Ser Thr Pro Gln  
 100 105 110  
 Met Ser Thr Leu Gln Gln Pro Ile Ser Ala Pro Trp Tyr Val Phe Phe  
 115 120 125  
 Arg Arg Gly Leu Ile Thr Asp Leu Ser Asn Pro Gln Thr Val Leu Phe  
 130 135 140  
 Phe Ile Ser Ile Phe Ser Val Thr Leu Asn Ala Glu Thr Pro Thr Trp  
 145 150 155 160  
 Ala Arg Leu Met Ala Trp Ala Gly Ile Val Leu Ala Ser Ile Ile Trp  
 165 170 175  
 Arg Val Phe Leu Ser Gln Ala Phe Ser Leu Pro Ala Val Arg Arg Ala  
 180 185 190  
 Tyr Gly Arg Met Gln Arg Val Ala Ser Arg Val Ile Gly Ala Ile Ile  
 195 200 205  
 Gly Val Phe Ala Leu Arg Leu Ile Tyr Glu Gly Val Thr Gln Arg  
 210 215 220

&lt;210&gt; 11

&lt;211&gt; 639

&lt;212&gt; DNA

&lt;213&gt; Escherichia coli

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(639)

&lt;400&gt; 11

gtg ttc gct gaa tac ggg gtt ctg aat tac tgg acc tat ctg gtt ggg 48

Met Phe Ala Glu Tyr Gly Val Leu Asn Tyr Trp Thr Tyr Leu Val Gly			
1	5	10	15
gcc att ttt att gtg ttg gtg cca ggg cca aat acc ctg ttt gta ctc			96
Ala Ile Phe Ile Val Leu Val Pro Gly Pro Asn Thr Leu Phe Val Leu			
20	25	30	
aaa aat agc gtc agt agc ggt atg aaa ggc ggt tat ctt gcg gcc tgc			144
Lys Asn Ser Val Ser Ser Gly Met Lys Gly Gly Tyr Leu Ala Ala Cys			
35	40	45	
ggt gta ttt att ggc gat gcg gta ttg atg ttt ctg gca tgg gct gga			192
Gly Val Phe Ile Gly Asp Ala Val Leu Met Phe Leu Ala Trp Ala Gly			
50	55	60	
gtg gcg aca tta att aag acc acc ccg ata tta ttc aac att gta cgt			240
Val Ala Thr Leu Ile Lys Thr Thr Pro Ile Leu Phe Asn Ile Val Arg			
65	70	75	80
tat ctt ggt gcg ttt tat ttg ctc tat ctg ggg agt aaa att ctt tac			288
Tyr Leu Gly Ala Phe Tyr Leu Leu Tyr Leu Gly Ser Lys Ile Leu Tyr			
85	90	95	
gcg acc ctg aag ggt aaa aat agc gag gcc aaa tcc gat gag ccc caa			336
Ala Thr Leu Lys Gly Lys Asn Ser Glu Ala Lys Ser Asp Glu Pro Gln			
100	105	110	
tac ggt gct att ttt aaa cgc gcg tta att ttg agc ctg act aat ccg			384
Tyr Gly Ala Ile Phe Lys Arg Ala Leu Ile Leu Ser Leu Thr Asn Pro			
115	120	125	
aaa gcc att ttg ttc tat gtg tcg ttt ttc gta cag ttt atc gat gtt			432
Lys Ala Ile Leu Phe Tyr Val Ser Phe Phe Val Gln Phe Ile Asp Val			
130	135	140	
aat gcc cca cat acg gga att tca ttc ttt att ctg gcg gcg acg ctg			480
Asn Ala Pro His Thr Gly Ile Ser Phe Phe Ile Leu Ala Ala Thr Leu			
145	150	155	160
gaa ctg gtg agt ttc tgc tat ttg agc ttc ctg att ata tct ggt gct			528
Glu Leu Val Ser Phe Cys Tyr Leu Ser Phe Leu Ile Ile Ser Gly Ala			
165	170	175	
ttt gtc acg cag tac ata cgt acc aaa aag aaa ctg gct aaa gtt ggc			576
Phe Val Thr Gln Tyr Ile Arg Thr Lys Lys Lys Leu Ala Lys Val Gly			
180	185	190	
aac tca ctg att ggt ttg atg ttc gtg ggt ttc gct gcc cga ctg gcg			624
Asn Ser Leu Ile Gly Leu Met Phe Val Gly Phe Ala Ala Arg Leu Ala			
195	200	205	
acg ctg caa tcc tga			639
Thr Leu Gln Ser			
210			

<210> 12  
 <211> 212  
 <212> PRT  
 <213> Escherichia coli

<400> 12

Met	Phe	Ala	Glu	Tyr	Gly	Val	Leu	Asn	Tyr	Trp	Thr	Tyr	Leu	Val	Gly
1															15
Ala	Ile	Phe	Ile	Val	Leu	Val	Pro	Gly	Pro	Asn	Thr	Leu	Phe	Val	Leu
															30
Lys	Asn	Ser	Val	Ser	Ser	Gly	Met	Lys	Gly	Gly	Tyr	Leu	Ala	Ala	Cys
															45
Gly	Val	Phe	Ile	Gly	Asp	Ala	Val	Leu	Met	Phe	Leu	Ala	Trp	Ala	Gly
															60
Val	Ala	Thr	Leu	Ile	Lys	Thr	Thr	Pro	Ile	Leu	Phe	Asn	Ile	Val	Arg
															80
Tyr	Leu	Gly	Ala	Phe	Tyr	Leu	Leu	Tyr	Leu	Gly	Ser	Lys	Ile	Leu	Tyr
															95
Ala	Thr	Leu	Lys	Gly	Lys	Asn	Ser	Glu	Ala	Lys	Ser	Asp	Glu	Pro	Gln
															110
Tyr	Gly	Ala	Ile	Phe	Lys	Arg	Ala	Leu	Ile	Leu	Ser	Leu	Thr	Asn	Pro
															125
Lys	Ala	Ile	Leu	Phe	Tyr	Val	Ser	Phe	Phe	Val	Gln	Phe	Ile	Asp	Val
															140
Asn	Ala	Pro	His	Thr	Gly	Ile	Ser	Phe	Phe	Ile	Leu	Ala	Ala	Thr	Leu
															160
Glu	Leu	Val	Ser	Phe	Cys	Tyr	Leu	Ser	Phe	Leu	Ile	Ile	Ser	Gly	Ala
															175
Phe	Val	Thr	Gln	Tyr	Ile	Arg	Thr	Lys	Lys	Lys	Leu	Ala	Lys	Val	Gly
															190
Asn	Ser	Leu	Ile	Gly	Leu	Met	Phe	Val	Gly	Phe	Ala	Ala	Arg	Leu	Ala
															205
Thr	Leu	Gln	Ser												
															210

<210> 13  
 <211> 588  
 <212> DNA  
 <213> Escherichia coli

<220>  
 <221> CDS

&lt;222&gt; (1)..(588)

&lt;400&gt; 13

gtg aca ccg acc ctt tta agt gct ttt tgg act tac acc ctg att acc	48
Met Thr Pro Thr Leu Leu Ser Ala Phe Trp Thr Tyr Thr Leu Ile Thr	
1 5 10 15	
gct atg acg cca gga ccg aac aat att ctc gcc ctt agc tct gct acg	96
Ala Met Thr Pro Gly Pro Asn Asn Ile Leu Ala Leu Ser Ser Ala Thr	
20 25 30	
tcg cat gga ttt cgt caa agt acc cgc gtg ctg gca ggg atg agt ctg	144
Ser His Gly Phe Arg Gln Ser Thr Arg Val Leu Ala Gly Met Ser Leu	
35 40 45	
gga ttt ttg att gtg atg tta ctg tgt gcg ggc att tca ttt tca ctg	192
Gly Phe Leu Ile Val Met Leu Leu Cys Ala Gly Ile Ser Phe Ser Leu	
50 55 60	
gca gtg att gac ccg gca gcg gta cac ctt ttg agt tgg gcg ggg gcg	240
Ala Val Ile Asp Pro Ala Ala Val His Leu Leu Ser Trp Ala Gly Ala	
65 70 75 80	
gca tat att gtc tgg ctg gcg tgg aaa atc gcc acc agc cca aca aag	288
Ala Tyr Ile Val Trp Leu Ala Trp Lys Ile Ala Thr Ser Pro Thr Lys	
85 90 95	
gaa gac gga ctt cag gca aaa cca atc agc ttt tgg gcc agc ttt gct	336
Glu Asp Gly Leu Gln Ala Lys Pro Ile Ser Phe Trp Ala Ser Phe Ala	
100 105 110	
ttg cag ttt gtg aac gtc aaa atc att ttg tac ggt gtt acg gca ctg	384
Leu Gln Phe Val Asn Val Lys Ile Ile Leu Tyr Gly Val Thr Ala Leu	
115 120 125	
tcg acg ttt gtt ctg ccg caa aca cag gcg tta agc tgg gta gtt ggc	432
Ser Thr Phe Val Leu Pro Gln Thr Gln Ala Leu Ser Trp Val Val Gly	
130 135 140	
gtc agc gtt ttg ctg gcg atg att ggg acg ttt ggc aat gtg tgc tgg	480
Val Ser Val Leu Leu Ala Met Ile Gly Thr Phe Gly Asn Val Cys Trp	
145 150 155 160	
gcg ctg gcg ggg cat ctg ttt cag cga ttg ttt cgc cag tat ggt cgc	528
Ala Leu Ala Gly His Leu Phe Gln Arg Leu Phe Arg Gln Tyr Gly Arg	
165 170 175	
cag tta aat atc gtg ctt gcc ctg ttg ctg gtc tat tgc gcg gta cgc	576
Gln Leu Asn Ile Val Leu Ala Leu Leu Val Tyr Cys Ala Val Arg	
180 185 190	
att ttc tat taa	588
Ile Phe Tyr	
195	

<210> 14  
<211> 195  
<212> PRT  
<213> Escherichia coli

<400> 14

Met	Thr	Pro	Thr	Leu	Leu	Ser	Ala	Phe	Trp	Thr	Tyr	Thr	Leu	Ile	Thr
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Ala	Met	Thr	Pro	Gly	Pro	Asn	Asn	Ile	Leu	Ala	Leu	Ser	Ser	Ala	Thr
	20							25					30		
Ser	His	Gly	Phe	Arg	Gln	Ser	Thr	Arg	Val	Leu	Ala	Gly	Met	Ser	Leu
	35					40						45			
Gly	Phe	Leu	Ile	Val	Met	Leu	Leu	Cys	Ala	Gly	Ile	Ser	Phe	Ser	Leu
	50				55				60						
Ala	Val	Ile	Asp	Pro	Ala	Ala	Val	His	Leu	Leu	Ser	Trp	Ala	Gly	Ala
	65				70				75				80		
Ala	Tyr	Ile	Val	Trp	Leu	Ala	Trp	Lys	Ile	Ala	Thr	Ser	Pro	Thr	Lys
		85						90				95			
Glu	Asp	Gly	Leu	Gln	Ala	Lys	Pro	Ile	Ser	Phe	Trp	Ala	Ser	Phe	Ala
		100				105						110			
Leu	Gln	Phe	Val	Asn	Val	Lys	Ile	Ile	Leu	Tyr	Gly	Val	Thr	Ala	Leu
		115				120						125			
Ser	Thr	Phe	Val	Leu	Pro	Gln	Thr	Gln	Ala	Leu	Ser	Trp	Val	Val	Gly
	130				135						140				
Val	Ser	Val	Leu	Leu	Ala	Met	Ile	Gly	Thr	Phe	Gly	Asn	Val	Cys	Trp
	145				150					155			160		
Ala	Leu	Ala	Gly	His	Leu	Phe	Gln	Arg	Leu	Phe	Arg	Gln	Tyr	Gly	Arg
						165			170			175			
Gln	Leu	Asn	Ile	Val	Leu	Ala	Leu	Leu	Leu	Val	Tyr	Cys	Ala	Val	Arg
					180				185			190			
Ile	Phe	Tyr													
		195													

<210> 15  
<211> 636  
<212> DNA  
<213> Escherichia coli

<220>  
<221> CDS  
<222> (1)..(636)



Leu Phe Ser  
210

<210> 16

<211> 211

<212> PRT

<213> Escherichia coli

<400> 16

Met Phe Ser Tyr Tyr Phe Gln Gly Leu Ala Leu Gly Ala Ala Met Ile  
1 5 10 15

Leu Pro Leu Gly Pro Gln Asn Ala Phe Val Met Asn Gln Gly Ile Arg  
20 25 30

Arg Gln Tyr His Ile Met Ile Ala Leu Leu Cys Ala Ile Ser Asp Leu  
35 40 45

Val Leu Ile Cys Ala Gly Ile Phe Gly Gly Ser Ala Leu Leu Met Gln  
50 55 60

Ser Pro Trp Leu Leu Ala Leu Val Thr Trp Gly Gly Val Ala Phe Leu  
65 70 75 80

Leu Trp Tyr Gly Phe Gly Ala Phe Lys Thr Ala Met Ser Ser Asn Ile  
85 90 95

Glu Leu Ala Ser Ala Glu Val Met Lys Gln Gly Arg Trp Lys Ile Ile  
100 105 110

Ala Thr Met Leu Ala Val Thr Trp Leu Asn Pro His Val Tyr Leu Asp  
115 120 125

Thr Phe Val Val Leu Gly Ser Leu Gly Gly Gln Leu Asp Val Glu Pro  
130 135 140

Lys Arg Trp Phe Ala Leu Gly Thr Ile Ser Ala Ser Phe Leu Trp Phe  
145 150 155 160

Phe Gly Leu Ala Leu Ala Ala Trp Leu Ala Pro Arg Leu Arg Thr  
165 170 175

Ala Lys Ala Gln Arg Ile Ile Asn Leu Val Val Gly Cys Val Met Trp  
180 185 190

Phe Ile Ala Leu Gln Leu Ala Arg Asp Gly Ile Ala His Ala Gln Ala  
195 200 205

Leu Phe Ser  
210

<210> 17

<211> 20

<212> DNA

<213> Artificial Sequence

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&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

&lt;400&gt; 17

gtgttggaaacc gacgcggat

20

&lt;210&gt; 18

&lt;211&gt; 23

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: primer for amplifying Escherichia coli yahN gene

&lt;400&gt; 18

tgtttatgg tacgggttc gag

23

&lt;210&gt; 19

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

&lt;400&gt; 19

ctttgccaat cccgtctccc

20

&lt;210&gt; 20

&lt;211&gt; 20

&lt;212&gt; DNA

&lt;213&gt; Artificial Sequence

&lt;220&gt;

&lt;223&gt; Description of Artificial Sequence: primer for amplifying Escherichia coli yeaS gene

&lt;400&gt; 20

gccccatgca taacggaaag 20  
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<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene  
  
<400> 21 26  
gaagatcttg taggccggat aaggcg  
  
<210> 22  
<211> 20  
<212> DNA  
<213> Artificial Sequence  
  
  
<220>  
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yfiK gene  
  
<400> 22 20  
tggttttacc aattggccgc  
  
<210> 23  
<211> 21  
<212> DNA  
<213> Artificial Sequence  
  
<220>  
<223> Description of Artificial Sequence: primer for amplifying Escherichia coli yggA gene  
  
<400> 23 21  
acttctcccg cgagccagt c  
  
<210> 24  
<211> 21  
<212> DNA  
<213> Artificial Sequence

&lt;220&gt;

<223> Description of Artificial Sequence: primer for amplifying Escherichia  
coli yggA gene

&lt;400&gt; 24

ggcaagctta gcgcctctgt t

21